

DRAFT Site Restoration Guidelines



Highway 1 in Monterey and San Luis Obispo Counties

SLO-1-71.4/74.3

MON-1-0.0/72.3

Caltrans District Five

February 2002

TABLE OF CONTENTS

I.	INTRODUCTION	1
II.	GENERAL GUIDELINES	1
	OBJECTIVES	1
	PROCEDURES	2
III.	SPECIFIC SITE RESTORATION GUIDELINES	2
	PHASE ONE: EROSION CONTROL.....	2
	PHASE TWO: REVEGETATION.....	4
	PHASE THREE: SITE MAINTENANCE.....	5
	PHASE FOUR: MONITORING AND REPORTING.....	6
IV.	IMPLEMENTATION STRATEGIES.....	8
	OBJECTIVES	8
	PROCEDURES	8
	IMPLEMENTATION MATRIX	9
V.	REFERENCES	10
VI.	APPENDICES	11
	APPENDIX A: EROSION CONTROL STANDARDS	A1
	APPENDIX B: NITROGEN FIXING SPECIES LIST AND RATES	B1
	APPENDIX C: EXOTIC SPECIES CONTROL METHODS AND TIMING	C1
	APPENDIX D: GLOSSARY OF TERMS.....	D1

I. INTRODUCTION

The Big Sur Coast Highway Management Plan (CHMP) is a document that will provide a framework for continued safe and efficient operation of Highway 1 in a manner that strives to preserve, restore, and maintain the natural and scenic characteristics of the highway corridor. The following set of guidelines is one of the many components that will help contribute to this ambitious management plan. Congruent with the CHMP vision, the intent of these site restoration guidelines is to provide a framework for consistent, pro-active site restoration efforts and to facilitate front-end decision-making processes on highway-related construction activities which may require erosion control and/or revegetation measures. In general, the guidelines advocate a cost-effective, site-specific, long-term management approach for achieving sustainable restoration of sites along the Big Sur coast.

The following guidelines will help direct Caltrans operations in the areas of erosion control, revegetation and site management at locations identified for restoration work. Every site will have its own restoration plan, specifically addressing the site's unique issues and concerns. However, in order to maintain consistency and quality in restoration efforts, every plan will be developed in accordance with this set of general and specific guidelines (Sections II and III.) A number of references were consulted in the creation of the following site restoration guidelines. These references include both published and informal documents, as well as meeting notes and summaries. For a complete list, please refer to the reference section at the end of this document.

It is recognized that in order to fully implement these guidelines corridor-wide, additional funding opportunities will need to be explored. However, the guidelines can serve as a platform from which to begin the dialogue about restoration efforts along the coast. These guidelines are a starting point for consistency in storm damage response (immediate) and site management (long-term). They provide an opportunity for feedback from specialists in all areas, and are amenable to change as further suggestions are made from inside and outside the Department of Transportation.

II. GENERAL GUIDELINES

Most of the site management objectives and procedures associated with restoration efforts have been distributed within the Specific Site Restoration Guidelines (Section III), however there are several objectives and procedures that are not exclusive to one phase. The following represent comprehensive desired outcomes for all Big Sur Coast Highway revegetation efforts.

Objectives

- Control soil erosion and prevent water pollution
- Preserve intact wildlife habitat along the Big Sur coast
- Restore disturbed sites to encourage a cover of self-sustaining native vegetation

DRAFT Site Restoration Guidelines

- Manage disturbed sites to promote natural succession and limit the spread of noxious weeds

Procedures

- At the beginning of the site evaluation process the needs for long-term site management, including revegetation efforts, must be taken into account. With storm related events, this process should begin with the first responders.
- Procedures will be site-specific, and, where feasible and applicable, adjacent landowner objectives will be taken into consideration. Where adjacent land is managed by another public entity, the agency's land management objectives and methodologies may take precedence over Caltrans site restoration procedures.

III. SPECIFIC SITE RESTORATION GUIDELINES

These guidelines include four major phases of site management work: 1) Erosion Control, 2) Revegetation, 3) Site Maintenance, and 4) Monitoring and Reporting. Each phase has its unique set of *objectives* and *procedures* that support the overarching, general objectives (Section II: General Guidelines) for the Big Sur Coast Highway restoration efforts. It must be noted that these phases are not mutually exclusive— each contains some element of the others, and some restoration measures cannot be confined to one category. In addition, it is important to point out that varying intensities of revegetation efforts will be appropriate at different sites. Due to unforgiving environmental factors at some locations, it may be inappropriate (ecologically and/or financially) to attempt revegetation.

Phase One: Erosion Control

A. Objectives

- Control surface erosion while recognizing physical limitations of controlling natural, geologic-scale processes
- Avoid adverse impacts associated with sedimentation
- Prevent further aggravation of unstable conditions

B. Procedures

1) Evaluate site conditions

- Involve Caltrans Construction, Maintenance, Environmental, Geotechnical and Landscape Architecture Departments in the site evaluation process.
- Determine the nature and severity of existing erosion.
- Identify the causes of existing erosion and measures to correct these conditions.
- Determine the influence of future landsliding or debris flow activity.
- Classify areas according to erosion control strategies (Appendix A: Erosion Control Standards.)
- Determine duff collection and plant salvage opportunities.

- 2) Implement appropriate best management practices (BMPs) for storm water pollution:
Recommendations from the statewide Stormwater Management Plan will be considered as appropriate to existing and anticipated site conditions. Background conditions must be considered for natural processes such as mudflows and sedimentation due to wave action, undercutting and natural land movements that may disrupt existing drainages and temporarily increase sedimentation into waterways.
- 3) Assess soil conditions
 - Test soil to ascertain revegetation potential (i.e. test for texture, fertility, organic matter, and salt content).
 - Determine whether or not soil amendments are necessary or appropriate for improvement of the site's soil conditions.
 - Adjust amendments accordingly to prevent potential inadvertent water pollution.
- 4) Collect duff and salvage plants, as appropriate
 - Determine the existence of beneficial duff—including an analysis of the presence of undesirable weed species.
 - Identify possible storage locations for both duff and salvaged plants.
 - If necessary, apply temporary erosion control measures to duff stockpiles.
- 5) Develop a long-term site management plan
 - Erosion control measures considered for implementation will first take individual site conditions, erosion severity, public safety, and threat to the roadway into account; subsequent erosion control measures will attempt to maintain compliance with the long-term restoration objectives.
 - All actions will consider the potential for aggravating larger slope instability. Erosion control evaluation will consider mechanical corrective measures first, followed by vegetative measures.
 - Mechanical measures can include jute netting/erosion control blanket, fiber rolls, straw bales, silt fences, detention basins, and willow wattles, depending on individual site conditions.^{1, 2}
 - Vegetative measures may consist of container planting, planting of cuttings, and seeding depending on individual site conditions.
 - Individual site management plans will consider:
 - Visibility or other special significance of the damage.
 - Preparation for future phases of restoration (i.e. local seed collection, plant propagation, and/or the use of pioneer species to begin the development of horticulturally suitable soil).
 - Establishment of weed control measures

¹ WSI Report- Chapter 3: Erosion Control and Revegetation Methodology

² Caltrans Storm Water Quality Handbook- Construction Site BMPs Manual.

Phase Two: Revegetation

A. Objectives

- Create environments suitable for natural and managed plant succession
- Employ revegetation methods that are the best fit for site conditions and adjacent land use practices.
- Utilize revegetation methods that will maximize returns on financial investments.
- Evaluate carefully any decisions regarding the use of certified or uncertified plant and seed species and sources in the collecting and planting processes.

B. Procedures

1) Determine appropriate revegetation approach

Throughout the development of these guidelines, three revegetation approaches were considered: natural succession promotion, managed succession, and accelerated climax community development. In addition to meeting the objectives of the general guidelines, as established earlier, these approaches have their own unique objectives and may be summarized as follows:

- Natural Succession Promotion— Objective: Utilize low intensity revegetation methods to encourage the natural succession of pioneer species. This method may include allowing the temporary establishment of non-native, non-invasive weedy species in order to encourage site stability while native species begin to emerge and reestablish themselves.³
- Managed Succession⁴— Objective: Manipulate the introduction of pioneer species to develop site conditions that are conducive to eventual climax species establishment.
- Accelerated Climax Community Development⁵— Objective: Restore a site to a desirable climax (or near climax) native plant community, in a reduced time from what natural processes would take. This method is generally more expensive than managed succession because it often involves more intensive plant propagation, planting, and irrigation work.

2) Collect seed and cuttings

- Utilize locally collected plants from undisturbed areas adjacent to restoration sites where feasible.
- Select seeds and seed mixes based on adaptability and performance rather than for recreation or simulation of native habitat. Often, site and soil conditions that require revegetation are much different than those that existed on site prior to disturbance. Therefore, plant material best adapted to perform at the site should be chosen.⁶

³ An example of the implementation of this approach can be viewed at: *Big Creek Reserve Coast Highway Information* <http://www.redshift.com/~bigcreek/roads/index.html>

⁴ *Roadside Manual*- Washington State Department of Transportation

⁵ *Roadside Manual*- Washington State Department of Transportation

⁶ *WSI Report*- Chapter 3: Erosion Control and Revegetation Methodology

- Use legumes to fix nitrogen in the soil, improve permeability of soil, and provide cover on sites typically devoid of vegetation in order to increase nutrient availability at disturbed sites. The use of legumes is a practical and less time consuming method for harsh sites that equipment cannot access, or for sites where soil amendments alone cannot adhere to steep slope faces (Appendix B: Nitrogen Fixing Species List and Rates.)
- Use tables from the Vegetation Establishment and Management Study (VEMS)⁷ as a resource to help provide a systematic and ecologically sound approach to the selection and placement of specific plant species at different restoration sites.

3) Initiate site preparation and planting

The intensity of any efforts aimed at establishing plants on disturbed sites will depend on which of the above revegetation approaches have been deemed appropriate for site conditions. However, plant establishment may include, and is not limited to, the following:

- Use stored materials from the site— if pre-construction conditions were determined appropriate for duff collection, this material can be spread over disturbed ground.
- Utilize pioneer species in order to assist soil improvement.
- Educate planting crews about plant species characteristics including:
 - water, light, and nutrient requirements
 - plant spacing requirements
 - physiological characteristics
 - responses to competition
 - how different species respond to proposed management techniques
- Install temporary (surface drip) irrigation systems at more intensively managed sites.

Phase Three: Site Maintenance

A. Objectives

- Maintain consistency with determined revegetation approaches
- Manage weeds while desirable plants become established at the site

B. Procedures

1) Establish plants

- Educate crews involved with maintaining plant health and promoting plant establishment about plant species characteristics including:
 - water, light, and nutrient requirements
 - physiological characteristics
 - responses to competition
 - how different species respond to proposed management techniques
- Control species performance, for example:

⁷ VEMS- Caltrans District-Level Guides to Plant Specifications for Erosion Control

- Mow undesirable species after flowering, but before seed production to eliminate reproduction
- Do not mow where desirable species exist until after seed production to allow for the next year's stand
- Use plant-specific application of selected herbicides, where appropriate.
- Utilize other practices such as irrigation, pruning, fertilizing, and plant replacement.

2) Establish weed control

Weed control supports the reestablishment of native species by limiting competition from invasive exotic species. It has been identified as one of the most important initial steps for the success of revegetation plantings, as well as for the successful reintroduction of species from adjacent native plant populations. In order to successfully eradicate undesirable plant species on a site we must first determine the primary target species at each site along with the perimeter of the weed control area and level of weed control required. Timing and continuity of weed control measures are critical to successful eradication (Appendix C: Exotic Species Control Methods and Timing.) Various weed control methods will be utilized and the application of these methods will vary based on site conditions and adjacent land use practices. These methods may include, but are not limited to, the following:

- Mowing
- Pulling
- Selective spot spraying of approved non-persisting, post-emergent pesticides

Phase Four: Monitoring and Reporting

A. Objectives

- Document revegetation success
- Identify problems experienced at each restoration site
- Provide ongoing recommendations for corrective measures, if necessary, to meet long term restoration goals for the site.

B. Procedures

1) Establish qualitative goals

General goals, with a determined restoration completion date, would apply to restoration areas with minimal environmental sensitivity and limited permit requirements. These goals would correspond to the site analysis and site management procedures (identified in Phase I) for restoring the location, and may include such measures as controlling invasive weeds, regulating soil erosion, and restoring a natural looking vegetative cover in disturbed areas.

2) Establish quantitative goals as needed

In Environmentally Sensitive Areas, or where otherwise required, quantitative revegetation goals will be established for individual restoration sites. These goals will

be determined by the Project Development Team (PDT) in consultation with permitting agencies and local groups. Goals may include percent cover, density, species diversity, or percent survival. Goals could be modified by the PDT as needed (in consultation with permitting agencies) to respond to changing site conditions.

3) Use mapping resources

Geographic Information Systems (GIS) mapping technology may be used to develop base sheets for projects, either for storm damage repair, site restoration or maintenance design work. Problem slopes, drainage patterns and current vegetative cover (especially Environmentally Sensitive Areas) can be delineated on the plans. Subsequent GIS surveys can be compiled into a comprehensive database for restoration sites on the coast, assisting in determining the success of restoration measures at each location. All project mapping, including base sheets developed from aerial photos, should be annotated to show Environmentally Sensitive Areas.

4) Report findings

- Reports from monitoring activities will be submitted on a regular basis depending on the goals set for each restoration site, site sensitivity, and the phase of the activity. (For example, reporting maybe be more frequent during periods of high activity, decreasing during plant establishment and maintenance stages.)
- Reports will be kept on file at Caltrans District 5 and made available to stakeholders and the public on request or as needed.

IV. IMPLEMENTATION STRATEGIES

Objectives

Ensure that adequate resources and support structures are in place to fully implement the recommendations of these guidelines.

Procedures

Monitoring and care of new plantings throughout the establishment period is critical to the success of revegetation projects. The nature of work at some restoration locations may require a more focused effort than typically provided for by traditional construction, maintenance or storm damage repair contracts. The intent of the following recommendations is to provide a platform from which to launch further evaluation and discussion of the creative funding, contracting, and staffing opportunities that will be necessary for the implementation of these guidelines.

1) Utilize specialty contracts

- Landscape contracts
 - Will sequence work over a minimum of 3 years to allow for managed succession and accelerated climax species practices.
 - Will require, at minimum, a landscape contractor's license and references for comparable restoration projects.
- Service Contracts
 - Will provide ongoing care and maintenance of restoration sites.
 - Possible services provided— annual native seed collection resulting in a viable seed bank; plant propagation with the establishment of an accessible nursery stock; site maintenance including watering, weeding and replacement planting.

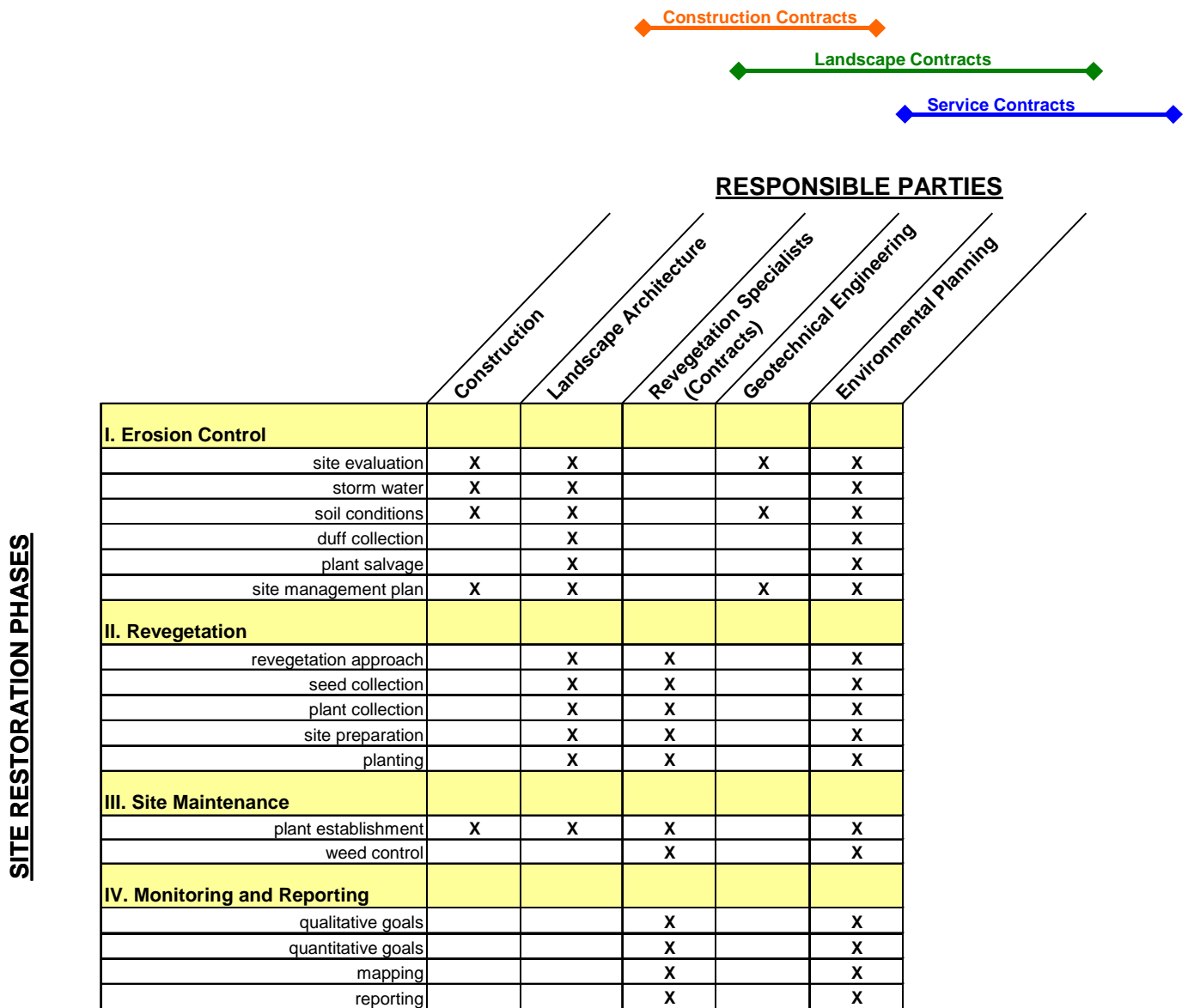
2) Assign a dedicated environmental monitor for the CHMP corridor

- Monitor will be an internal liaison between Caltrans Construction, Maintenance, Environmental, Geotechnical and Landscape Architecture Departments and will provide external communication with the various permitting agencies.
- Monitor should be involved in all stages of the project:
 - Before— help delineate Environmentally Sensitive Areas; provide information about necessary permit compliance; serve as an advisor to the resident engineer.
 - During— ensure that there are no discrepancies between environmental plans, restoration management goals, and on-ground activities; be able to make defensible decisions in the field (using knowledge of appropriate environmental laws and permitting requirements); serve as an advisor to the resident engineer.
 - After— continue to monitor plant establishment at revegetation sites; serve as a liaison between Caltrans and private revegetation contractors; assist in meeting reporting requirements.

DRAFT Site Restoration Guidelines

Implementation Matrix

The following figure is the first attempt at delineating the specific steps within each site restoration phase into a table format, and matching these steps with the various parties responsible for implementation.



V. REFERENCES

Big Creek Reserve Coast Highway Information. (n.d.). Retrieved November 2001, from <http://www.redshift.com/~bigcreek/roads/index.html>

Big Sur CHMP Suggested Guidelines for Planting Trees. Prepared by: John Smiley, University of California Big Creek Reserve. November 2000.

Big Sur Coast Highway One Erosion and Revegetation Management: an Examination of Revegetation Practices at McWay and Other Regional Sites. Prepared by: The Watershed Institute, California State University Monterey Bay and Rana Creek Habitat Restoration. December 2000. (Referred to, in this document, as WSI Report.)

Caltrans Storm Water Quality Handbook- Construction Site BMPs Manual. November 2000.

CHMP PDT meeting discussions and subsequent action items. March-October 2001.

Roadside Manual- Washington State Department of Transportation, February 2000.
Scenic and Habitat Working Group Meeting Summaries. July 2000- June 2001.
Storm Damage Response and Repair Working Group Meeting summaries. May 2000-July 2001.

Vegetation Establishment and Management Study (VEMS): Caltrans District-Level Guides to Plant Specifications for Erosion Control. Prepared by: VEMS Project Team/Soil Science Department, California Polytechnic State University, San Luis Obispo. June 2001.

VI. APPENDICES

Appendix A: Erosion Control Standards

Appendix B: Nitrogen Fixing Species List and Rates

Appendix C: Exotic Species Control Methods and Timing

Appendix D: Glossary of Terms

Appendix A: Erosion Control Standards⁸

EROSION CONTROL STANDARDS	
CLASSIFICATION	SUGGESTED REMEDIATION
Class 1. No soil loss or erosion: topsoil layer intact, well dispersed accumulation of litter from past year's growth plus smaller amounts of older litter.	No action required
Class 2. Soil movement slight and difficult to recognize: small deposits of soil in form of fans or cones at end of small gullies or fills, or as accumulations back of plant crowns or behind litter, litter not well dispersed or no accumulation from past year's growth obvious.	Re-seed (as per temporary erosion control or specific habitat) Apply loose straw and/or 'flakes' as needed Apply only to gullies and or accumulation. Control or divert source of erosion
Class 3. Soil movement or loss more noticeable, topsoil evident, with some plants on pedestals or in hummocks: rill marks evident, poorly dispersed litter and bare spots not protected by litter.	Re-establish and compact surface grade in eroded areas Re-seed (as per temporary erosion control or specific habitat) Apply loose straw and/or 'flakes' as needed Control or divert source of erosion Install straw wattles and/or silt fence
Class 4. Soil movement and loss readily recognizable: topsoil remnants with vertical sides and exposed plant roots; roots frequently exposed: litter in relatively small amounts and washed into erosion protected patches.	Re-apply and compact soil Re-establish surface grade in eroded areas Re-seed (as per temporary erosion control or specific habitat) Apply loose straw and/or 'flakes' as needed Control or divert source of erosion Install straw wattles and/or silt fence
Class 5. Advanced erosion; active gullies with steep sidewalls: well-developed erosion pavement on gravelly soils, litter mostly washed away.	Re-apply and compact soil Re-establish surface grade in eroded areas Haul in and place fill materials/rock Re-seed (as per temporary erosion control or specific habitat) Apply loose straw and/or 'flakes' as needed Control or divert source of erosion Install straw wattles and/or silt fence

⁸ WSI Report- Chapter 3: Erosion Control and Revegetation Methodology, Table 3.3.

Appendix B: Nitrogen Fixing Species List and Rates⁹

NITROGEN FIXING SPECIES LIST AND RATES			
SCIENTIFIC NAME	COMMON NAME	APPLICATION RATE	APPLICATION
<i>Lupinus albifrons</i>	Silver bush lupine	8-10 pounds/ acre	Perennial, upright large stature grows in disturbed places associated with coast sage scrub. Used for revegetation on harsh sites and loose soil and fill sites.
<i>Lupinus arboreus</i>	Tree lupine	8-10 pounds/acre	Perennial, large stature grows in disturbed places associated with coast sage scrub. Used for revegetation on harsh sites and loose soil and fill sites.
<i>Lupinus benthamii</i>	Bentham's annual lupine	6-8 pounds/acre	Perennial, compact shrub grows in disturbed places associated with coast sage scrub. Used for revegetation on harsh sites and loose soil and fill sites.
<i>Lupinus nanus</i>	Sky lupine	4-6 pounds/acre	Annual, fast growing, diminutive flowering plant. Revegetation of roadside berms, cut and fill slopes
<i>Troifolium wildenovii</i>	Tomcat clover	2-3 pounds/acre	Annual, fast growing, Revegetation of roadside berms, cut and fill slopes. Performs well on poor soil sites
<i>Trifolium gracilentum</i>	Pinpoint clover	2-3 pounds/acre	Annual, fast growing, Revegetation of roadside berms, cut and fill slopes. Performs well on poor soil sites
<i>Lotus stigosus</i>	Bishops lotus	2-3 pounds/acre	Short-lived annual. Grows well on disturbed cut slope locations and poor soils
<i>Lotus purshianus</i>	Spanish clover	4-5 pounds/acre	Short-lived annual. Grows well on disturbed cut slope locations and poor soils most wooded locations.
<i>Lotus benthamii</i>	Bentham's lotus	4-5 pounds/acre	Perennial, low growing. Grows well on cut slopes, and roadside berms

⁹ WSI Report- Chapter 3: Erosion Control and Revegetation Methodology, Table 3.6.

Appendix C: Exotic Species Control Methods and Timing¹⁰

EXOTIC SPECIES CONTROL METHODS AND TIMING				
Species	Seed Bank Life ¹	CalEPPC Exotic Pest Rating ²	Control Treatment	Timing
Jubata Grass (<i>Cortaderia jubata</i>)	Short	A-1	Manual control – Dig mature plants manually or hand pull seedling plants	October to January
			Flower control – Cut flower tops back prior to seed maturation. Dispose of flower tops. Do not disperse or mulch.	May to July
			Herbicide control – Round-Up applied at 2-4% with Blazon blue agricultural dye.	May to August
French Broom (<i>Genista monspessulanus</i>)	Very Long	A-1	Manual control – Dig, weed wrench, or hand pull seedling plants.	October to February
			Flower control – Weed eat or machete seed bearing plants. Dispose of seed bearing plant parts. Do not disperse or mulch.	May to July
			Herbicide control during or after flowering– Garlon 4 applied at 4% with Blazon blue agricultural dye. Herbicide control during active growth stage– Round-up applied at 2-4% with Blazon agricultural dye.	May to July January to April
Purple Star Thistle (<i>Centarea calcitrapa</i>)	Short	B	Manual control – Dig plants manually or hand pull seedline plants. Graze plants intensively in the rosette stage.	February to March
			Flower control – Weed eat or machete flowering plants prior to seed maturation. Dispose of seed bearing plant parts. Do not disperse.	May to July
			Herbicide control – Spot spray Round-Up applied at 2% with Blazon blue agricultural dye.	March to April
Fennel (<i>Foeniculum vulgare</i>)	Long	A-1	Herbicide control- Spot spray Round-Up applied at 2% with Blazon blue agricultural dye.	March to April
Gorse (<i>Ulex europaeus</i>)	Very Long	A-1	Manual control – Dig or hand pull seedling plants.	October to February
			Flower control – Weed eat or machete seed bearing plants. Dispose of seed bearing plant parts. Do not disperse.	May to July
			Herbicide control – Garlon 4 applied at 4% with Blazon blue agricultural dye. Spray plants prior to flowering.	April to July

¹⁰ WSI Report- Chapter 3: Erosion Control and Revegetation Methodology, Table 38.

EXOTIC SPECIES CONTROL METHODS AND TIMING				
Species	Seed Bank Life ¹	CalEPPC Exotic Pest Rating ²	Control Treatment	Timing
Bull Thistle (<i>Cirsium vulgare</i>)	Short	B	Manual control – Dig plants manually or hand pull seedling plants. Graze plants intensively in the rosette stage.	February to March
			Flower control – Weed eat or machete flowering plants prior to seed maturation. Dispose of seed bearing plant parts. Do not disperse.	May to July
			Herbicide control – Spot spray Round-Up applied at 2% with Blazon blue agricultural dye.	March to April
Eucalyptus (<i>Eucalyptus globosus</i>)	Long	A-1	Manual control – Hand pull seedlings. Cut down entire tree. Frill cambium on stump.	October to March
			Herbicide control – Garlon 4 applied at 25% with Blazon blue agricultural dye and surfactant.	March to July
English Ivy (<i>Hedera helix</i>)	Long	B	Manual control – Machete or handpull green vegetation.	October to March
			Herbicide control – Rodeo* applied at 2% with Blazon blue agricultural dye and surfactant. *Rodeo to be used near freshwater resources.	March to June
Poison Hemlock (<i>Conium maculatum</i>)	Short	B	Manual control – Mow or cut plants prior to flowering.	April to May
			Herbicide control – Round-Up applied at 2% with Blazon blue agricultural dye and surfactant. Spray plants prior to flowering.	April to May
Cape Ivy (<i>Senecio mikanioides</i>)	Long	A-1	Rodeo at 1.5% with a 1/2% non-ionic surfactant	November-February
			Manual control – Machete or handpull green vegetation.	March - November
Sticky Eupatorium (<i>Ageratina adenophora</i>)	Short	B	Herbicide control – Round-Up applied at 2% with Blazon blue agricultural dye and surfactant. Spray plants prior to flowering.	March-April

Appendix D: Glossary of Terms

best management practices (BMPs) Physical, vegetative, and managerial practices that improve downstream water quality during and after storm events.

certified seed Source-specific seed that has been tested for purity and germination rates.

climax species Plant species representative of the adjacent plant community that indicate relatively stable site conditions and the restoration of native habitat.

duff Topsoil, leaf litter, and surface organic matter that can help re-establish horticulturally suitable soils for revegetation efforts.

Environmentally Sensitive Areas (ESAs) Areas identified as containing sensitive biological, historic, visual or cultural resources.

pioneer species Fast growing plants including grasses, forbs, perennials and legumes that control erosion and help set the stage for larger woody native plant encroachment.

plant salvage Collection, maintenance, and transplanting of desirable plant species prior to construction activities.

Stormwater Management Plan Identification and implementation of site specific BMPs.

weed Undesirable, invasive species found in, but not native to a particular area, also referred to as exotic species.